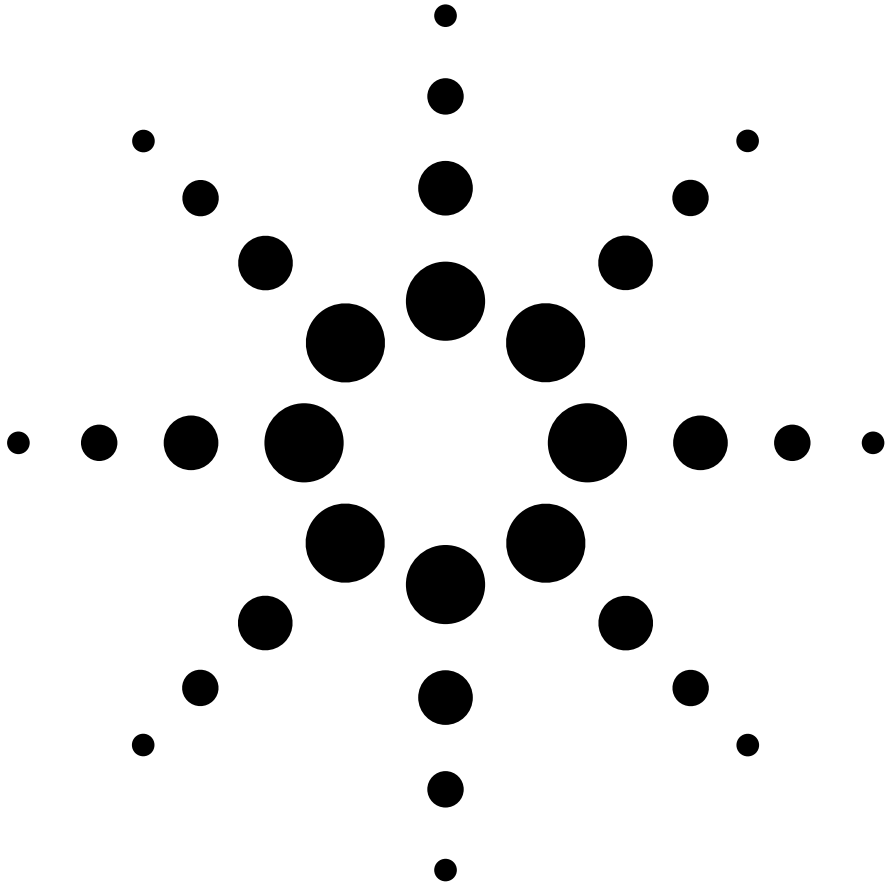

Installation Guide

Electron Capture Detector on 6890 GC
Accessories G1533A, G1593A, G2397A

Agilent Technologies

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Part number G1533-90327

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Replaces Part Nos. G1533-90300, *Installation Guide - Micro Electron Capture Detector,* G2397-90305, *Update for the Micro Electron Capture Detector Accessory Installation Guide*, and G2397-90320, *Installing the Micro Electron Capture Detector EPC Flow Control Manifold*.

Printed in USA

Safety Information

The Agilent Technologies 6890 Gas Chromatograph meets the following IEC (International Electrotechnical Commission) classifications: Safety Class 1, Transient Overvoltage Category II, and Pollution Degree 2.

This unit has been designed and tested in accordance with recognized safety standards and designed for use indoors. If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired. Whenever the safety protection of the Agilent 6890 has been compromised, disconnect the unit from all power sources and secure the unit against unintended operation.

Refer servicing to qualified service personnel. Substituting parts or performing any unauthorized modification to the instrument may result in a safety hazard. Disconnect the AC power cord before removing covers. The customer should not attempt to replace the battery or fuses in this instrument. The battery contained in this instrument is recyclable.

Safety Symbols

Warnings in the manual or on the instrument must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions violates safety standards of design and the intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

WARNING
A warning calls attention to a condition or possible situation that could cause injury to the user.

CAUTION
A caution calls attention to a condition or possible situation that could damage or destroy the product or the user's work.

Indicates a hot surface

Indicates earth (ground) terminal

Sound Emission Certification for Federal Republic of Germany

Sound pressure Lp < 68 dB(A)

During normal operation
At the operator position
According to ISO 7779 (Type Test)

Schallemission

Schalldruckpegel LP < 68 dB(A)
Am Arbeitsplatz
Normaler Betrieb
Nach DIN 45635 T. 19 (Typprüfung)

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USA

Overview

This is the procedure for installing an electron capture detector (ECD) on an Agilent 6890 Gas Chromatograph (hereafter referred to as the GC).

Parts List

EPC

- ECD assembly (General License)
- Nutwarmer cup and insulation assembly
- Caution: Radioactive Material label
- Caution: Vent exit tube to fume hood label

NonEPC

- ECD assembly (General License)
- Nutwarmer cup and insulation assembly
- Makeup gas regulator
- Two machine screws
- Caution: Radioactive Material label
- Caution: Vent exit tube to fume hood label

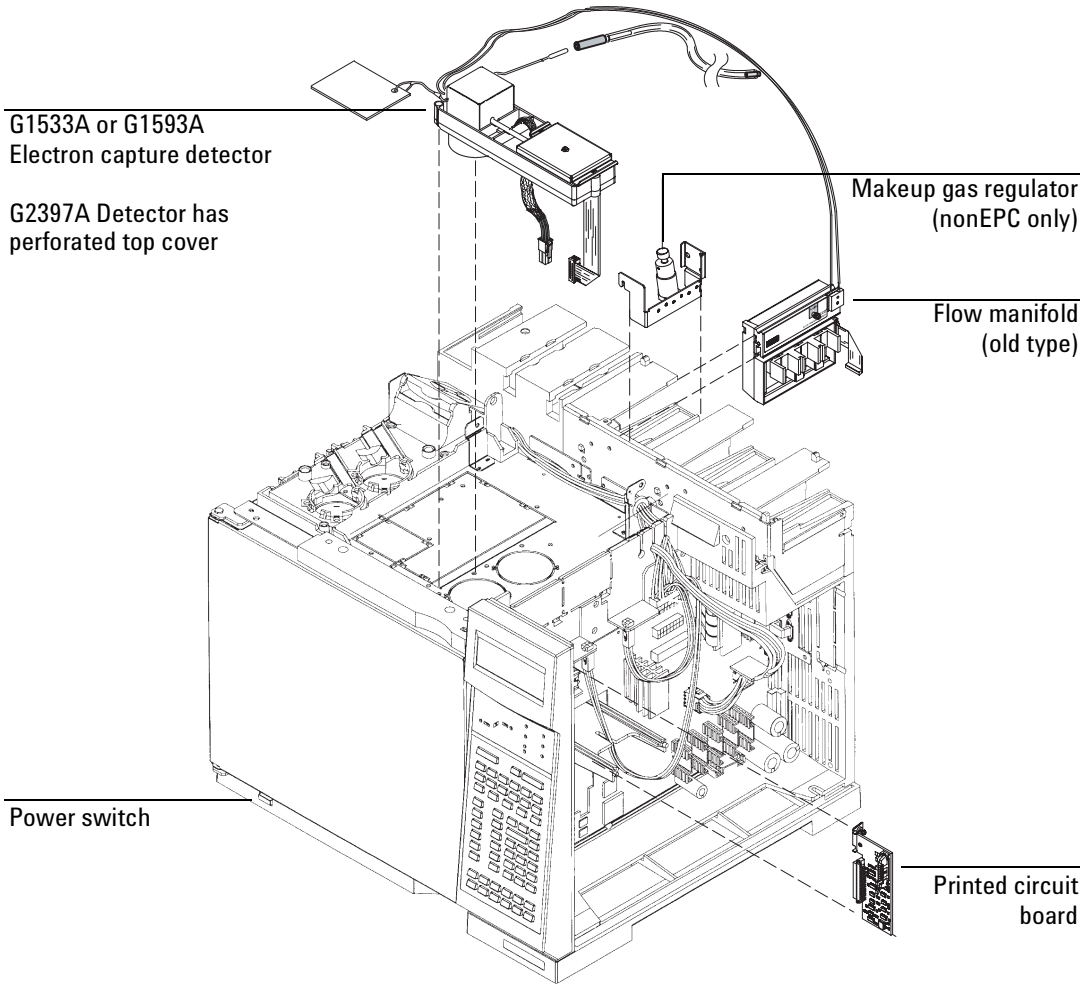
Required Tools

Electrostatic protection such as grounded wrist strap (part no. 9300-0969, large or part no. 9300-0970, small)

- T-20 Torx screwdriver
- Diagonal cutters
- 7/16-inch wrench (nonEPC detectors only)

Steps

1. Preparing the GC
2. Installing the flow manifold
3. Installing the regulator (nonEPC detectors only)
4. Positioning and securing the detector
5. Connecting the detector
6. Routing the tubing
7. Installing the nutwarmer cup
8. Restoring the GC to operating condition


G1533A or G1593A
Electron capture detector
G2397A Detector has
perforated top cover
Makeup gas regulator
(nonEPC only)
Flow manifold
(old type)
Power switch
Printed circuit
board

Preparing the GC

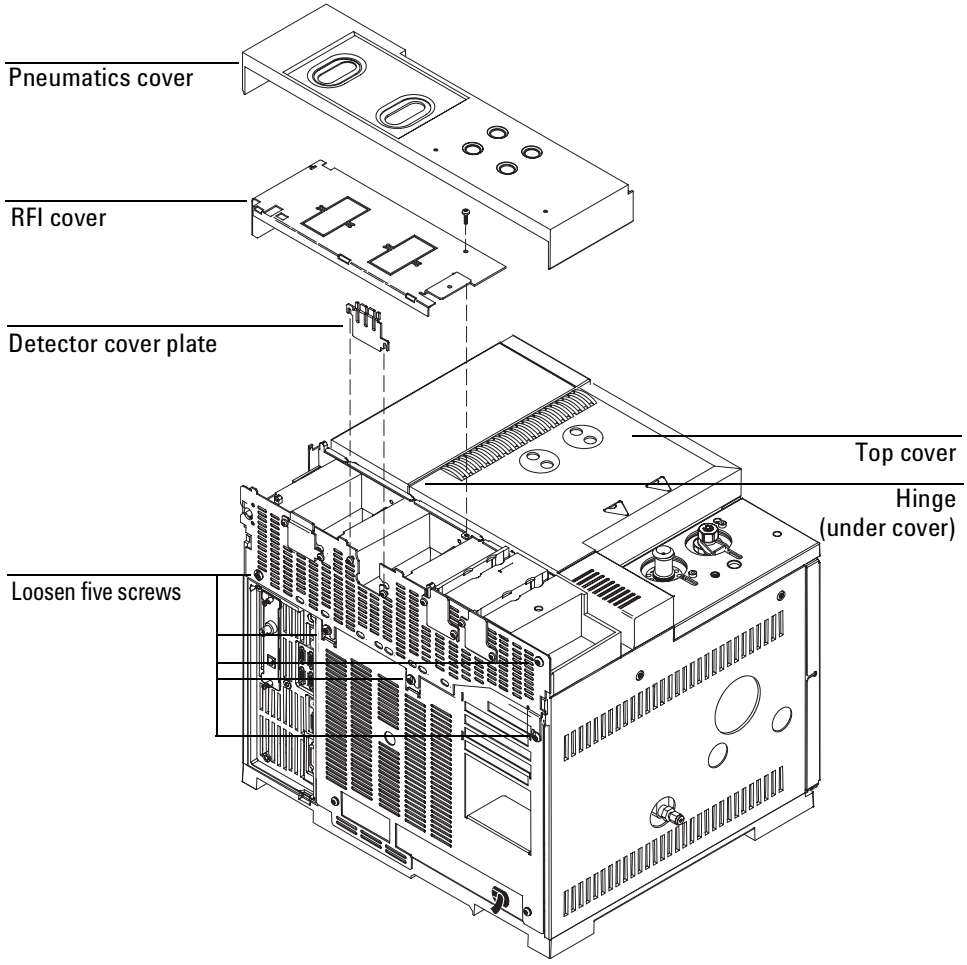
WARNING Hazardous voltages are present in the mainframe when the GC is plugged in. Avoid a potentially dangerous shock hazard by unplugging the power cord before removing the side panels.

1. Turn off the GC and unplug the power cord. Allow time for all heated zones to cool and then turn off supply gases at their sources.

From the back of the GC (see the figure on the next page):

2. Unsnap and lift off the pneumatics top cover.
3. Remove the RFI cover. Remove the screw with a T-20 Torx screwdriver, slide the cover to the left until it disengages from the top rear panel, and remove it.
4. If you are installing a nonEPC detector, remove the detector cover plate from the front or back position. If the plate is held by two screws, loosen the two screws with a T-20 Torx screwdriver and slide the plate up and off. If the cover plate is part of the rear panel, cut the webs that hold the cover plate in place and discard it.

5. Loosen the four or five screws in the top rear panel with a T-20 Torx screwdriver. Grasp the panel at each end and gently lift it up and then away from the GC. Be careful not to disrupt the supply tubing.



6. Raise the gray plastic top cover (with the holes and ventilation slots) to the vertical position. Examine the hinge in the right rear corner.

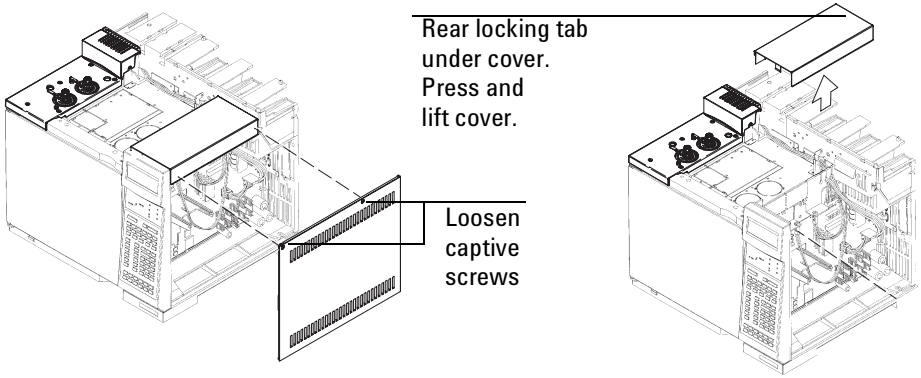
- **Early 6890 models.** The hinge is a metal bracket attached to the oven top. Pull the clip at its top toward you to release the hinge pin. Push the

pin to the left to release the cover. Raise the right side of the cover and remove it.

- **Current 6890 models.** Raise the right side of the cover and remove it.

Caution Board components can be damaged by static electricity; use a properly grounded static control wrist strap when removing the electronics covers.

7. Remove the electronics side and top covers.



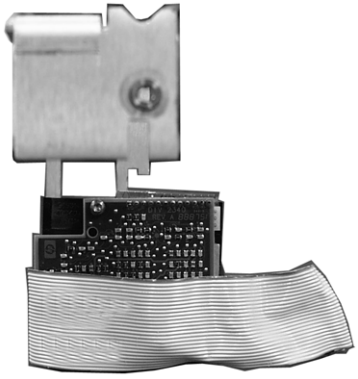
Electronics side cover **Electronics top cover**

Installing the flow manifold

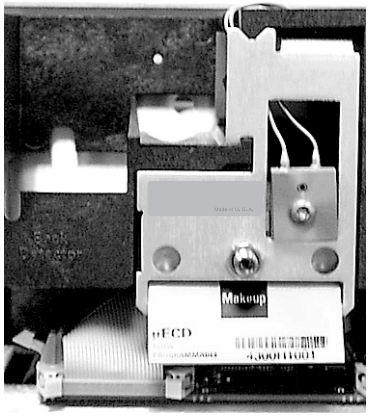
This section describes the current version of the manifold. For the early version, see the appendix.

Caution Always hold the manifold by its support bracket to avoid damaging board components.

1. Route the ribbon cable behind the manifold assembly as shown in Figure 1. Then, slide the manifold and bracket assembly into the slot until the bracket seats flush against the end of the rails. See Figure 2.



Back view of manifold



Manifold installed with cable routed to left

Figure 1. Routing the ribbon cable

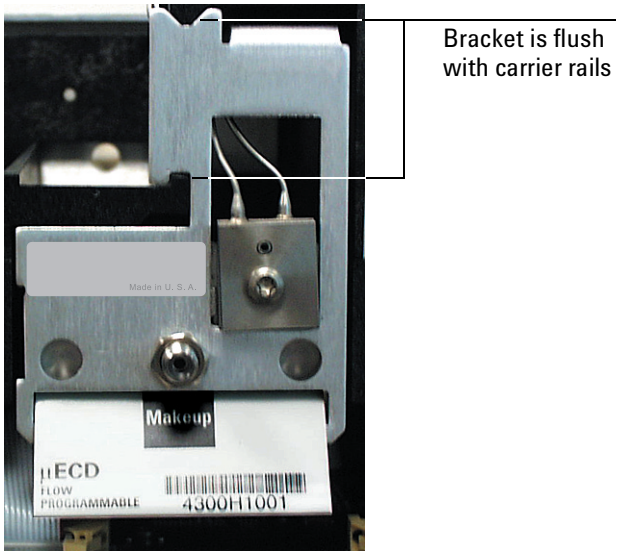


Figure 2. Manifold, after installation

2. Route the gas tubing behind the manifold, over the top of the chassis, and through the slots to the detector area. See Figure 3.
3. Connect the ribbon cable to the mating connector on the pneumatics board. Arrange the cable to keep it away from the valves and keep it from being pinched between board components and the manifold.

   For the back detector, you may want to loosen the manifold and slide it out of the carrier a few centimeters to connect the cable to the pneumatics board. Then, reinstall the manifold.

4. Secure the manifold in place using the captive Torx T-20 screw. See Figure 3.

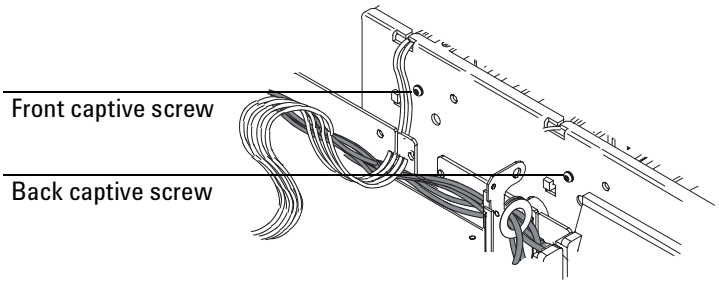


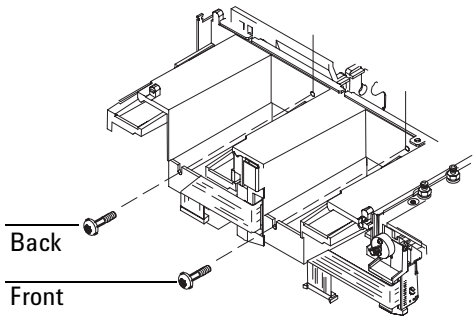
Figure 3. Captive screw locations

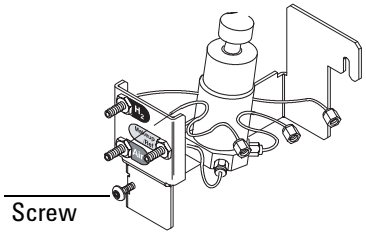
Installing the makeup gas regulator

For nonEPC G1533A and G1593A detectors only

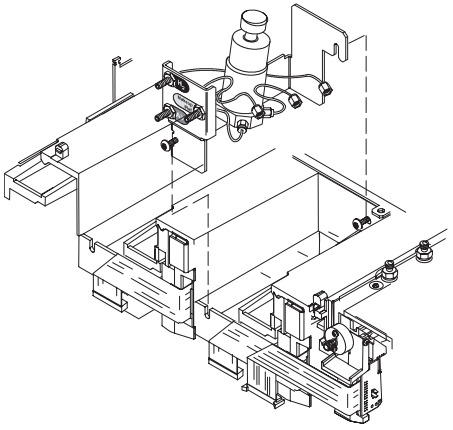
1. Install a screw in the front or back position of the pneumatics carrier. Do not tighten the screw.

   Install a screw in the makeup gas regulator. Do not tighten the screw.



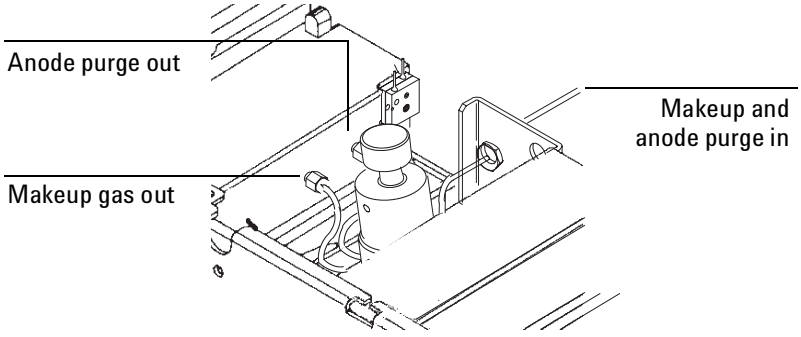


2. Place the makeup gas regulator in the front or back position of the pneumatics carrier. Tighten the screws with a T-20 Torx screwdriver.



3. Connect the shortest tube on the makeup/anode gas regulator to the fitting labeled MU on the flow manifold. Tighten the nut finger tight, then use the 7/16-inch wrench to tighten it 3/4 of a turn. Use the same

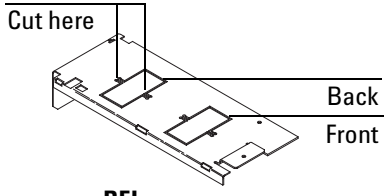
procedure to connect the anode purge tubing to the fitting labeled Anode.



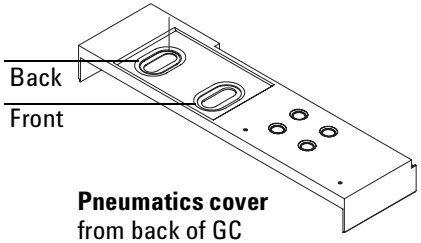
4. Locate the RFI and pneumatics covers that you removed in Preparing the GC.

   RFI cover. Remove the rectangular cutout in the front or back detector position. Use diagonal cutters to cut the metal as shown or work the cutout back and forth until it breaks free.

   Pneumatics cover. Remove the oval labels in the front or back detector position by pushing on the label from underneath the cover.



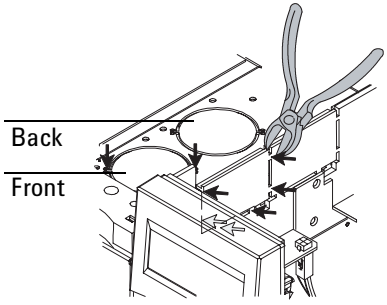
RFI cover
from back of GC



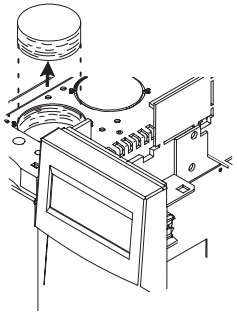
Pneumatics cover
from back of GC

Positioning and securing the detector

1. Remove the round metal cutout on the oven top and the square plastic cutout in the electronics carrier in the front or back detector position, if necessary. Cut the metal circle with diagonal cutters so that the nibs are connected to the piece removed. Cut the plastic in six places with diagonal cutters. Discard the cutouts.



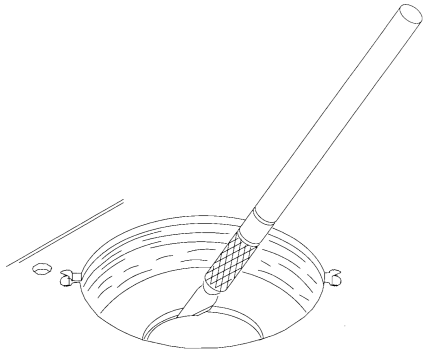
2. Lift out the die-cut insulation plug from the front or back detector position, if necessary.



Caution Be careful to remove only the insulation within the scribed circle.

3. Carefully remove the scribed circle of insulation from the oven top to create an opening into the oven.

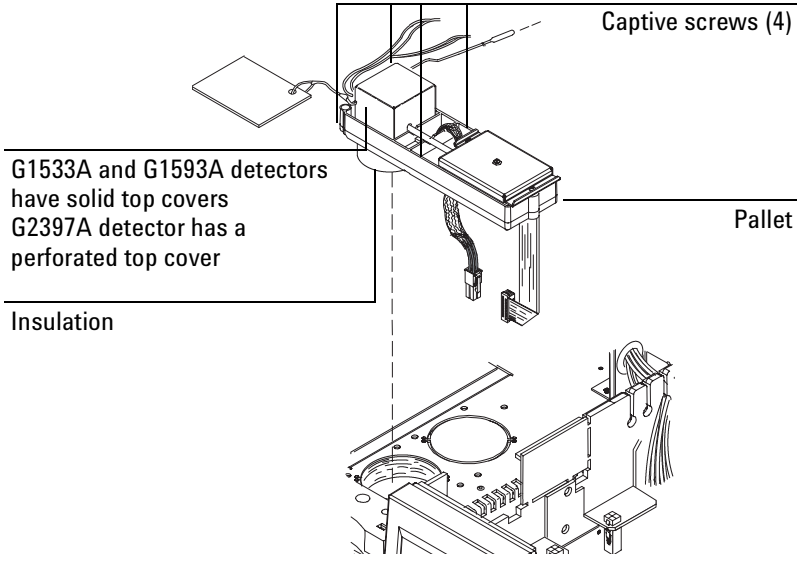
Method 1: Use a sharp knife to cut out the insulation using the scribed circle as a guide.



Method 2: Pierce the insulation with a screwdriver. Rotate the screwdriver around the circumference of the scribed circle to remove excess insulation.

Clean up any pieces of insulation that fall inside the oven.

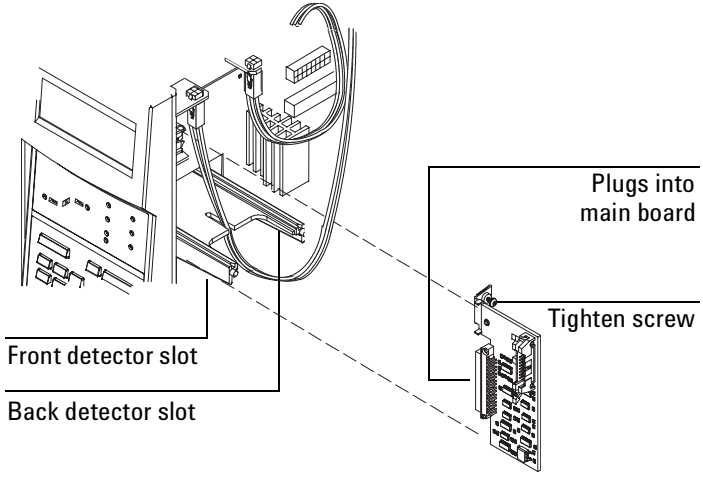
4. Make certain the insulation is properly installed on the detector base. Place the detector pallet into the front or back detector mounting location as shown. Partially tighten the four screws with a T20 Torx screwdriver. Retighten until snug.


Captive screws (4)
G1533A and G1593A detectors have solid top covers
G2397A detector has a perforated top cover
Pallet
Insulation

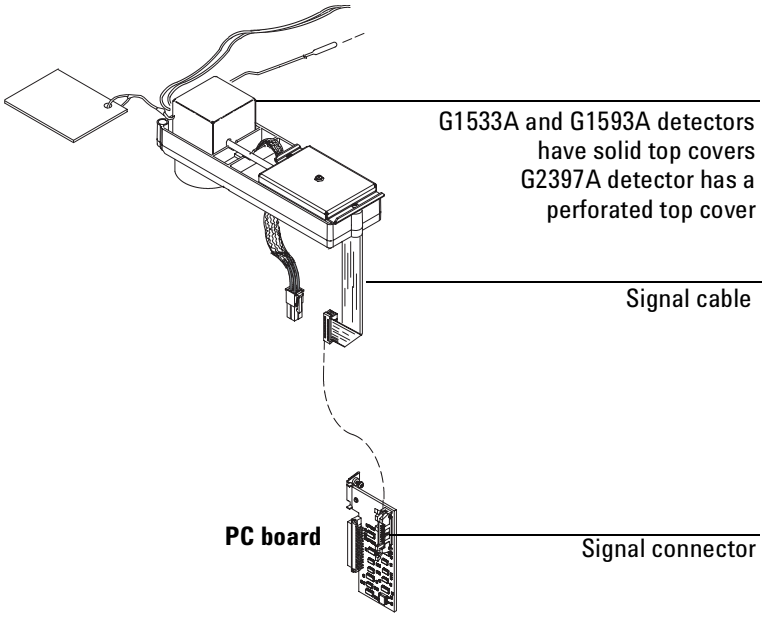
Connecting the detector

Caution Board components can be damaged by static electricity; use a properly grounded static control wrist strap when handling the board.

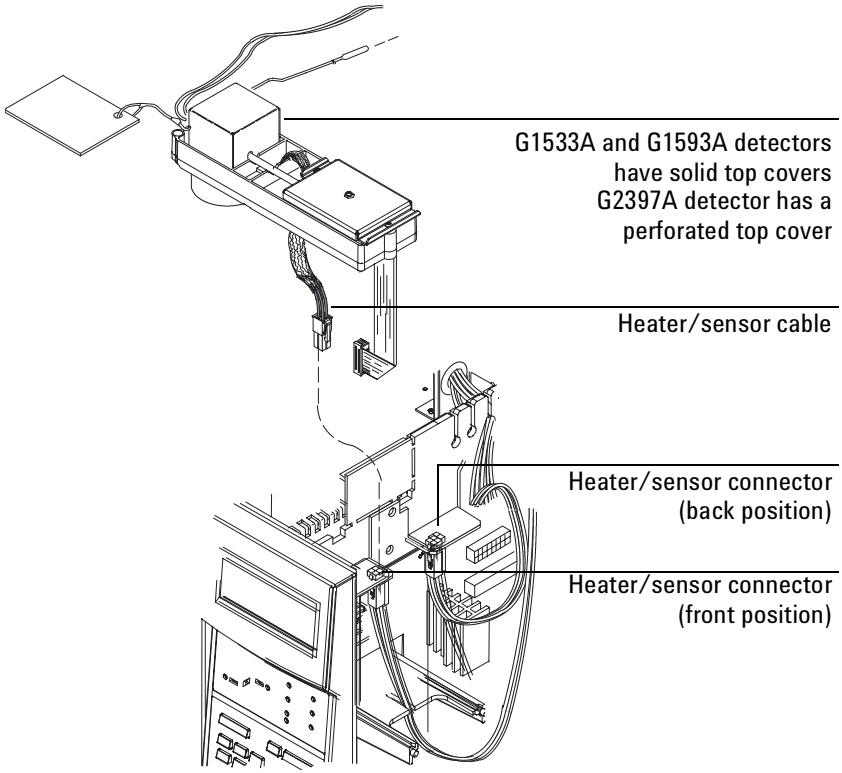
1. Remove the PC board from its static control bag, slide it into the front or back slot on the main circuit board, and plug it into the main board. Tighten the screw with a T-20 Torx screwdriver.



2. Attach the signal cable to the PC board, if not already connected.



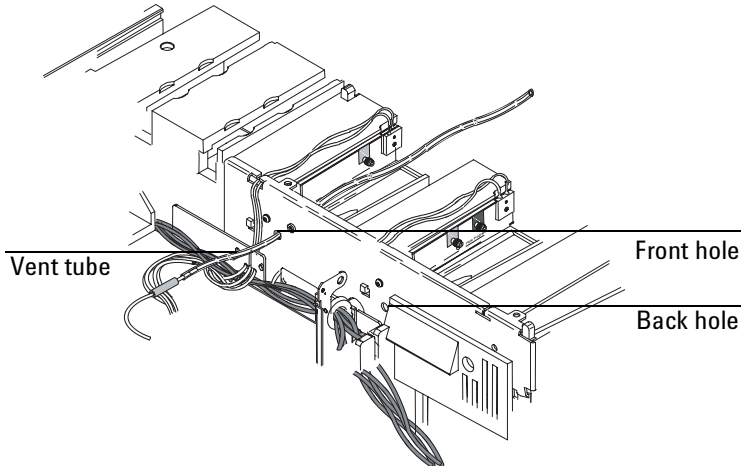
3. Connect the heater/sensor cable connector to the square connector closest to the detector.



WARNING The effluent gas stream from the detector must be vented to a fume hood to prevent possible contamination of the laboratory with radioactive material.

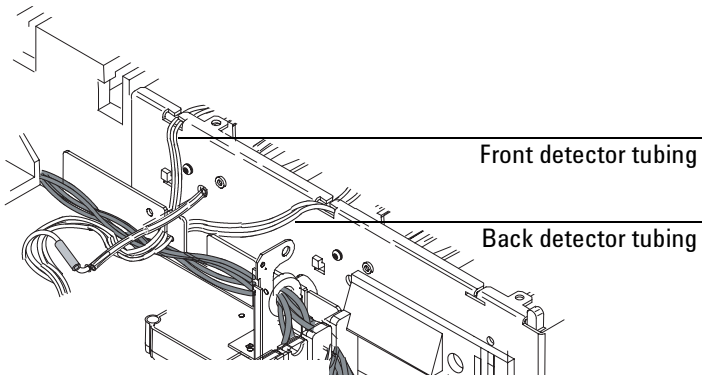
USA Owners: Detector venting must be in conformance with the latest revision of Title 10, Code of Federal Regulations, Part 20 (including Appendix B).

4. Route the vent tube across the oven top, through the hole in the pneumatics carrier, and out the back of the instrument.



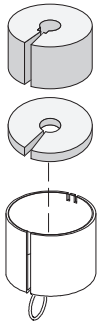
Routing the tubing

Route the tubing from the flow manifold over the top of the pneumatics chassis, through the appropriate slot, to the detector area.

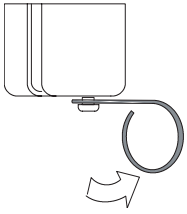


Installing the nutwarmer cup

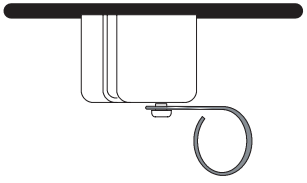
1. Install the insulation in the cup.



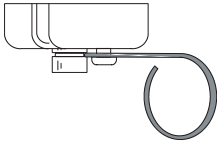
2. Push the wire spring lever at the bottom of the cup to the right to uncover the hole.



3. From inside the oven, place the cup over the detector fitting so that the top of the cup touches the top of the oven.



4. Release the spring. Make certain the spring fits in the groove of the detector fitting.



Restoring the GC to operating condition

1. Reinstall the electronics side panel and top cover.

Caution

If your current top rear panel is not similar to the one shown in Figure 4 below, discard it and use the new one supplied with your accessory kit.

2. Using a pair of needle-nosed pliers, remove the appropriate top rear panel detector cutout for the µECD. Also remove any cutouts needed to access other manifolds or accessories installed in the GC. See Figure 4.

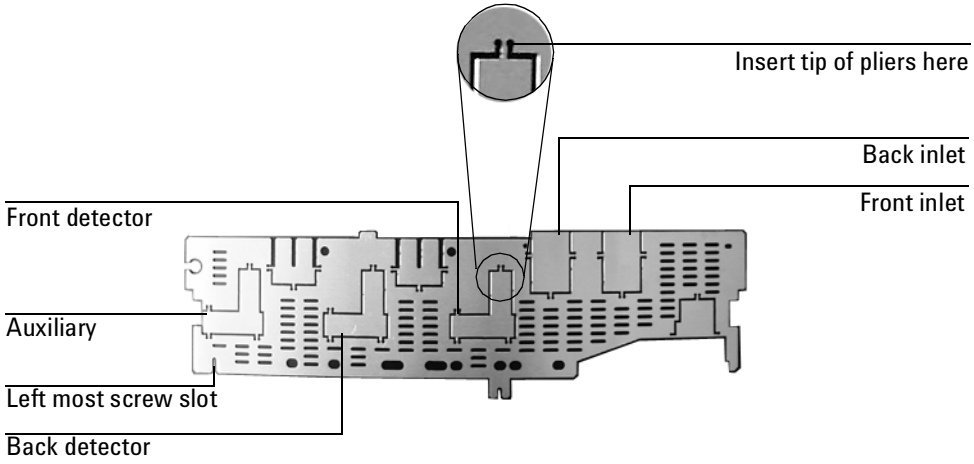
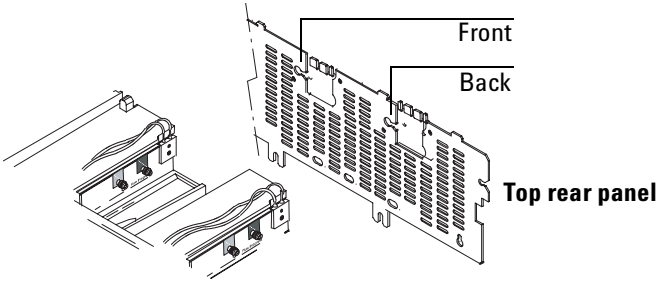


Figure 4. Top rear panel cutouts

3. Place the new top rear panel on its left-most mounting screw. Working from left to right and using the screw as a hinge, slide each manifold ID tag through its cutout in the panel. When all the tags are through the panel, finish installing the panel on the GC.

4. Route the vent tube through the hole in the top rear panel and connect the vent tube to a fume hood. Place the *Caution: Vent exit tube to fume hood* sticker on the top rear panel next to the vent tube.



5. Reinstall the top rear panel.
6. Reinstall the detector cover. Place the *Caution: Radioactive Material* sticker next to the appropriate vent on the detector cover.
7. Reinstall the RFI cover.
8. Replace the pneumatics top cover.
9. Restore gas pressures and leak test the fittings.
10. Plug in the GC and turn it on.
11. Press [Front Det] or [Back Det]. If the detector has been properly installed, you will see one of the following displays:

G2397A detector

FRONT DET (µ-ECD)			
Temp	250	250	
Mkup (N2)	0.x†	0.0	<
Output		400	

EPC G1533A and G1593A detectors

FRONT DET (ECD)			
Temp	250	250	
Anode gas	0.x†	0.0	
Mkup (N2)	0.x†	0.0	
Adjust offset		Off	
Output		40	
Ref current		1.00	

NonEPC detectors

FRONT DET (ECD)			
Temp	24	Off	
Anode gas		Off	
Mkup (N2)		Off	<
Adjust offset		Off	
Output		0.0	
Ref current		0.00	

† An "actual" flow value is displayed when the gases are off or not connected. This is not an error. After the gases are connected and the detector is operational, the actual flow values equal the setpoint values.

Calibrating your detector (EPC only)

Your detector's flow manifold contains a pressure sensor that must be zeroed after it is installed on your GC. This calibration procedure ensures an accurate flow display.

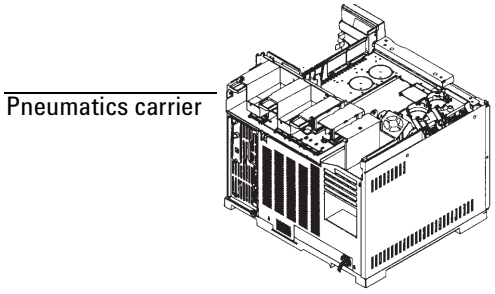
Caution Do not connect the detector and makeup gases to your flow manifold until you have zeroed your detector's pressure sensor.

1. Plug in your GC and turn it on, if you haven't already done so.
2. Wait 15 minutes. This allows your GC to reach thermal equilibrium.
3. Zero the detector's pressure sensor:
   a. Press [Options], scroll to Calibration and press [Enter].
   b. Scroll to Front detector or Back detector and press [Enter].
   c. Scroll to Anode zero and press [On] (not present on G2397A μECD).
   d. Scroll to Makeup zero and press [On].
4. Turn off your GC and unplug the power cord.
5. Plumb the makeup/anode purge gas to your detector. See the *Site Preparation and Installation Manual* for instructions.
6. Reinstall the RFI cover.
7. Replace the pneumatics top cover.
8. Plug in the GC again and turn it on. If your GC does not detect the new detector, check the following connections:
   - Detector card to main board
   - Manifold to pneumatics board
   - Heater-sensor connector
   - Signal cable to detector card

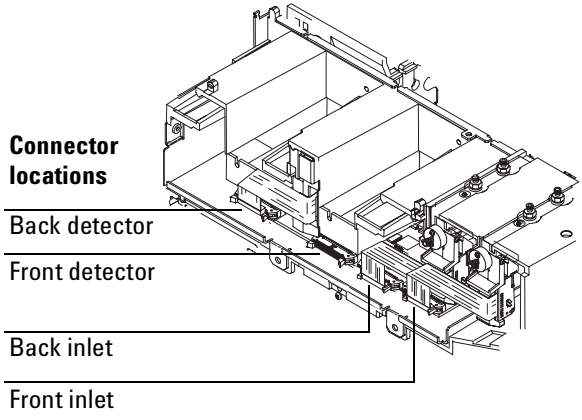
   If you installed an EPC detector but you have only temperature control, check the connection between the flow manifold and the pneumatics board.

Appendix: Installing the pneumatics module (early version)

1. From the back of the instrument, locate the pneumatics carrier.

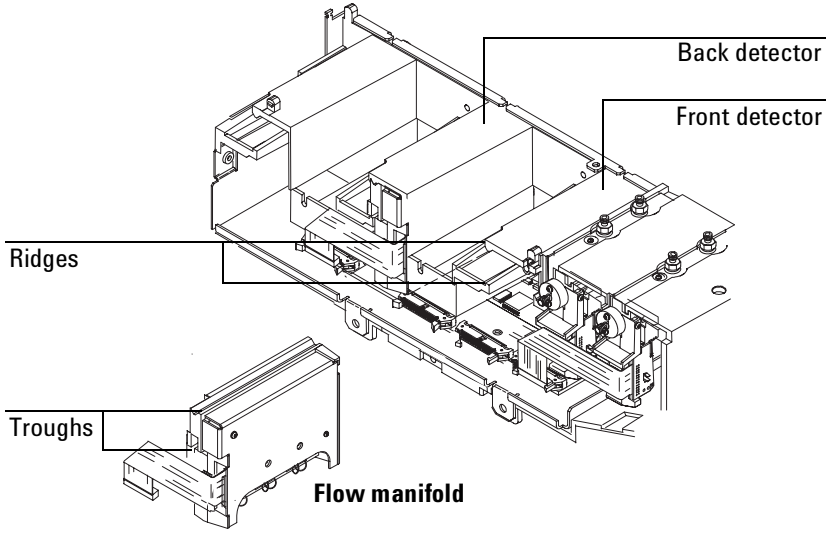


2. If you are installing a detector in the front position and an inlet is installed in the back position, unplug the back inlet ribbon cable. Unlock the connector by pushing the tabs away from the center.

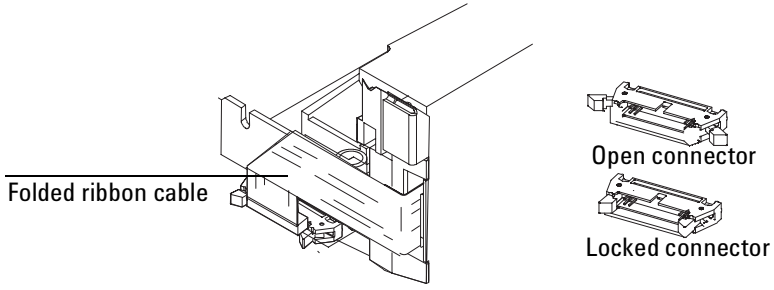


3. Locate the troughs in the flow manifold and the ridges in the pneumatics carrier. Decide where the detector will be mounted and

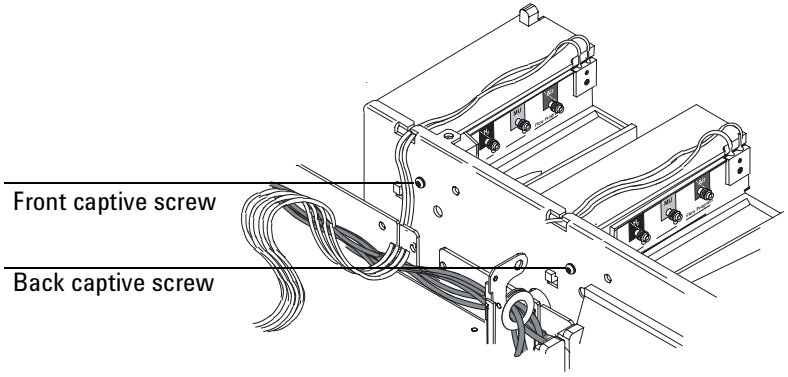
slide the flow manifold into the corresponding carrier position, lining up the ridges and troughs.



4. Plug the ribbon cable into its connector. Be sure the connector is firmly seated and locked. If the flow manifold is installed and plugged into the correct position, the ribbon cable will retain its fold as shown below. If you unplugged an inlet ribbon cable in Step 2, replace it.



5. From the front of the GC, secure the flow manifold to the carrier by tightening the captive screw until snug using a T-20 Torx screwdriver.



Appendix: Installing the pneumatics module (early version)

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